

What is claimed is:

1. An isolated peptide exhibiting lipid acyl hydrolase activity and corn rootworm insect inhibitory bioactivity comprising the amino acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:29, SEQ ID NO:31, SEQ ID NO:33, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:40, and SEQ ID NO:41.
2. The peptide according to claim 1 further comprising amino acid sequence motifs comprising
 - a) a first motif comprising Gly-Xaa₁-Ser-Xaa₂-Gly as set forth in SEQ ID NO:14, wherein Xaa₁ and Xaa₂ are Ser or Thr;
 - b) a second motif comprising Glu-Xaa₁-Xaa₂-Leu-Val-Asp-Gly as set forth in SEQ ID NO:15, wherein Xaa₁ comprises the amino acids selected from the group consisting of Tyr, Phe, and Trp, and wherein Xaa₂ comprises the amino acids selected from the group consisting of His and Asn; and
 - c) a third motif comprising Phe-Tyr-Xaa₁-Glu-Xaa₂-Gly-Pro as set forth in SEQ ID NO:42, wherein Xaa₁ comprises the amino acids selected from the group consisting of Phe, Ile, and Leu, and wherein Xaa₂ comprises the amino acids selected from the group consisting of His and Asn.
3. The peptide according to claim 2 wherein the substitution of
 - a) Ser in said first motif for any other amino acid;
 - b) Asp in said second motif for any other amino acid; or
 - c) Xaa₂ in said third motif for any amino acid other than His or Asneliminates the lipid acyl hydrolase activity and insect bioactivity of said peptide.

4. The peptide of claim 1, wherein said peptide is not naturally occurring.
5. The peptide of claim 2, wherein said peptide is not naturally occurring.
- 5 6. A method for selecting an isolated protein exhibiting lipid acyl hydrolase activity and corn rootworm insect inhibitory bioactivity comprising the steps of
- a) identifying the amino acid sequence of said protein;
- b) identifying in said sequence the presence of
- 10 i) a first motif comprising Gly-Xaa₁-Ser-Xaa₂-Gly as set forth in SEQ ID NO:14, wherein Xaa₁ and Xaa₂ are Ser or Thr;
- ii) a second motif comprising Glu-Xaa₁-Xaa₂-Leu-Val-Asp-Gly as set forth in SEQ ID NO:15, wherein Xaa₁ comprises the amino acids selected from the group consisting of Tyr, Phe, and Trp, and wherein Xaa₂ comprises the amino acids selected from the group consisting of
- 15 His and Asn; and
- iii) a third motif comprising Phe-Tyr-Xaa₁-Glu-Xaa₂-Gly-Pro as set forth in SEQ ID NO:42, wherein Xaa₁ comprises the amino acids selected from the group consisting of Phe, Ile, and Leu, and wherein Xaa₂ comprises the amino acids selected from the group consisting of
- 20 His and Asn;
- c) identifying a lipid acyl hydrolase activity; and
- d) identifying a corn rootworm insect inhibitory bioactivity.
7. The method of claim 6, wherein said protein is not naturally occurring.
- 25 8. A method for protecting a plant from Coleopteran insect infestation comprising providing to said plant a Coleopteran insect inhibitory amount of a protein exhibiting lipid acyl hydrolase activity, wherein said protein comprises
- a) a first motif comprising Gly-Xaa₁-Ser-Xaa₂-Gly as set forth in SEQ ID
- 30 NO:14, wherein Xaa₁ and Xaa₂ are Ser or Thr;
- b) a second motif comprising Glu-Xaa₁-Xaa₂-Leu-Val-Asp-Gly as set forth in SEQ ID NO:15, wherein Xaa₁ comprises the amino acids selected from the

- group consisting of Tyr, Phe, and Trp, and wherein Xaa₂ comprises the amino acids selected from the group consisting of His and Asn; and
- c) a third motif comprising Phe-Tyr-Xaa₁-Glu-Xaa₂-Gly-Pro as set forth in SEQ ID NO:42, wherein Xaa₁ comprises the amino acids selected from the group consisting of Phe, Ile, and Leu, and wherein Xaa₂ comprises the amino acids selected from the group consisting of His and Asn.
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9. The method according to claim 8 wherein said protein is selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:29, SEQ ID NO:31, SEQ ID NO:33, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:40, and SEQ ID NO:41.
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10. The method according to claim 8 wherein said protein is not naturally occurring.
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11. An isolated and purified nucleic acid sequence encoding a lipid acyl hydrolase comprising the nucleic acid sequence selected from the group consisting of SEQ ID NO:20, SEQ ID NO:22, SEQ ID NO:24, SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:30, SEQ ID NO:32, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:37, and SEQ ID NO:38.
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12. A method of transforming a plant cell to express a protein exhibiting a lipid acyl hydrolase activity and a corn rootworm inhibitory bioactivity comprising the steps of
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- a) introducing into the DNA of a plant cell a polynucleotide sequence comprising a selectable marker and the following elements linked sequentially: a plant functional promoter operably linked to a sequence encoding said protein, which is operably linked to a plant functional 3' transcription termination and polyadenylation sequence;
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- b) growing said plant cell in selective media to identify stably transformed plant cells; and

c) selecting a plant cell expressing said protein;

wherein said protein expressed in said plant cell is selected from the group

consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID

NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:9, SEQ ID NO:10,

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SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:21, SEQ

ID NO:23, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:29, SEQ ID

NO:31, SEQ ID NO:33, SEQ ID NO:35, SEQ ID NO:36, SEQ ID

NO:40, and SEQ ID NO:41.